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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/567,415

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Marc D. Andelman

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EXAMINER

MENDEZ, ZULMARIAM

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/567,415	Applicant(s) ANDELMAN ET AL.	
	Examiner ZULMARIAM MENDEZ	Art Unit 1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 May 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-33 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/26/2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4, 5, 7, 10-13, 16, 17, 19, 20, 24-28, 30, 32 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by Andelman (WO 01/95410).

With regard to claim, Andelman discloses a flow through capacitor comprising a plurality of flow through capacitor cells (page 2, lines 26-30; page 3, lines 14-20), each of said plurality of cells in electrical communication with one charge cycle sequence controller wherein the system is constructed and arranged so that the charge sequence controller individually controls charging of each of said plurality of cells (page 2, lines 14-21; page 5, lines 4-16; page 11, lines 11-18).

With regard to claim 2, Andelman teaches multiple current collectors and a flow spacer shared among said current collectors (page 12, line 22 to page 13, line 6).

With regard to claim 4, Andelman further discloses a conductivity controlled valve between the at least two of the current collectors (page 3, lines 6-13; page 10, lines 3-25).

With regard to claim 5, Andelman teaches wherein the fluid connection between the cells may be a parallel connection wherein 2 streams of fluid are continuously

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separated into different collection paths (see figure 5; page 20, line 1 to page 21, line 10).

With regard to claim 7, Andelman teaches wherein valves are individually triggered with charge cycles to produce a purified product stream (page 4, lines 11-17; page 20, lines 1-9).

With regard to claim 10, Andelman teaches wherein the charge cycles of individual cells are synchronized to correspond with a segment of purified water traveling in series through the cells (page 6, lines 6-34; page 7, lines 1-19).

With regard to claims 11 and 13, Andelman discloses wherein voltage is incremented/varies as cells are sequentially powered in series (page 5, lines 4-15).

With regard to claim 12, Andelman teaches wherein the cells are powered by sequentially switching them together in parallel (page 6, lines 6-34).

With regard to claim 16, Andelman teaches wherein individual flow through capacitor cells are controlled in a timed sequence (page 17, line 12 to page 18, line 31; page 14, lines 16-34).

With regard to claims 17 and 30, Andelman further discloses wherein the flow through capacitor system may be contained in a holder (page 1, lines 15-25).

With regard to claim 19, Andelman discloses wherein charge cycles are actuated by a conductivity reading and/or a voltage (page 18, line 32 to page 19, line 9; page 14, lines 3-15).

With regard to claim 20, Andelman teaches wherein valves to individual cells or groups of cells dispose of waste and purified fluid (page 20, lines 1-9).

With regard to claim 24, Andelman teaches wherein the flow through capacitor system may also include a power management system/power supply (page 3, lines 1-5).

With regard to claim 25, Andelman discloses wherein some cells may be bypassed by means of a sensing circuit (page 9, line 25 to page 10, line 17; page 19, line 18 to page 21, line 10).

With regard to claims 26 and 28, Andelman further teaches wherein fluid flows from one or more cells are combined together through a manifold (page 5, line 16 to page 6 line 9).

With regard to claim 27, Andelman discloses wherein the system achieves better than 70% purification (page 19, lines 18-25).

With regard to claim 32, Andelman discloses wherein if wastewater exceeds a desired threshold concentration, charge or discharge current through the capacitor may be decreased in each cycle (page 17, line 12 to page 18, line 31).

With regard to claim 33, Andelman teaches wherein at least one of said cells differs in size from at least one other of the cells (page 6, lines 6-21).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 3, 6, 15, 18, 21-23, 29 and 31 are rejected under 35 U.S.C. 103(a) as being obvious over Andelman ('375) in view of Andelman (US Patent Application Publication no. 2002/0167782).

6. The applied reference has a common assignee and inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing

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that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(I)(1) and § 706.02(I)(2).

With regard to claims 3 and 6, Andelman ('375) fails to teach wherein multiple concentration bands exist simultaneously within a given material and wherein the fluid is manipulated to form adjacent streams that are separately collected without the need of a valve. Andelman ('782) teaches wherein concentration fluid streams/bands may exist simultaneously within a given material layer (page 2, paragraph 18; page 5, paragraph 54; page 6, paragraph 56) in order to simultaneously isolate purified and concentrated fluid streams. Andelman ('782) further discloses wherein fluid is manipulated to form adjacent purification and concentration streams that are separately collected without the need of a valve (page 2, paragraph 31; page 3, paragraph 38; page 5, paragraphs 50 and 54; page 6, paragraph 60). It would have been obvious to one having ordinary skill in the art to modify the flow-through capacitor system of Andelman ('375), as taught by Andelman ('782) in order to simultaneously isolate purified and concentrated fluid streams.

With regard to claim 15, Andelman ('375) fails to teach a DC to DC converter between cells or groups of cells. Andelman ('782) discloses a DC to DC converter between the cells in order to discharge a capacitor and recover the energy thereby (page 7, paragraph 67). Therefore, it would have been obvious to one having ordinary skill in the art to add a DC to DC converter between the cells, as taught by Andelman ('782) in order to discharge a capacitor and recover the energy thereby.

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With regard to claims 18 and 22, Andelman ('782) teaches wherein the charge cycles of individual cells are synchronized or out of phase by one or more seconds or between 0 to 360 degrees in order to purify or concentrate in stages (page 7, paragraph 71; page 8, paragraph 79; page 9, paragraphs 84 and 85). Therefore, one having ordinary skill in the art at the time of the invention would have found it obvious to modify the flow-through capacity system as taught by Andelman ('782) in order to purify or concentrate in stages.

With regard to claim 21, even though the modified Andelman fails to explicitly teach wherein the peak wattage of power supply to the system is reduced to at least 30%, the applicant discloses in paragraph 12 of the instant invention that in order to reduce/cut the peak wattage of power supplies by 30% or more charge cycles of individual cells or groups of cells, either in series or parallel, are preferably actuated sequentially, or between 1 and 359 degrees out of phase, such as by charging or discharging. Therefore, since Andelman ('782) discloses wherein the charge cycles of individual cells are synchronized or out of phase by one or more seconds or between 0 to 360 degrees in order to purify or concentrate in stages (page 7, paragraph 71; page 8, paragraph 79; page 9, paragraphs 84 and 85), one having ordinary skill in the art would expect the flow-through capacity system of the modified Andelman to reduce the peak wattage of the power source to at least 30% as claimed.

With regard to claim 23, Andelman ('375) fails to teach wherein sequential operation of charge cycles follows the direction of flow. Andelman ('782) discloses wherein sequential operation of charge cycles follows the direction of flow in order to

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further purify or concentrate a fluid stream as it passes through each successive capacitor (page 7, paragraph 71 to page 8, paragraph 78). It would have been obvious to one having ordinary skill in the art to modify the system as taught by Andelman ('782) in order to further purify or concentrate a fluid stream as it passes through each successive capacitor.

With regard to claim 29, the modified Andelman fails to explicitly teach wherein a dead volume due to the flow spacer is larger than the dead volume between the capacitor cell and the inside of the cartridge holder. However, Andelman ('782) does teach wherein dead volume is defined as the geometrically-calculated volume taken up by all the flow channels and flow spacer within the charge barrier flow-through capacitor cell, cartridge holder, and any connecting tubes, tanks, or piping (page 10, paragraph 91). The dead volume may be modified according to flow rate in order to create a lag period, which give the subsequent cell to wash out its purified, concentrated or feed water solution prior to triggering a rising or declining voltage cycle that initiates concentration or purification in that cell, of flow between cells of any length time (page 9, paragraph 85). Therefore one having ordinary skill in the art would have found it obvious to adjust the dead volume within the system, as taught by Andelman, in order to create a lag period, which give the subsequent cell to wash out its purified, concentrated or feed water solution prior to triggering a rising or declining voltage cycle that initiates concentration or purification in that cell, of flow between cells of any length time.

With regard to claim 31, Andelman ('782) further teaches wherein a plurality of current collectors bracket a stack of series electrode assemblies (figure 1; page 2,

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paragraph 12; page 4, paragraph 46) in order to increase the efficiency with which the flow-through capacitor purifies or concentrate ions.

7. Claims 8, 9 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Andelman ('375), as applied to claim 1 above.

With regard to claims 8 and 9, even though Andelman ('375) fails to explicitly teach wherein the staging efficiency of the system and a power efficiency of 50% or more, since the flow-through capacitor system of Andelman ('375) meets all of the claimed structural limitations, one having ordinary skill in the art would expect the system of Andelman ('375) to have a staging and power efficiencies of 50% or more.

With regard to claim 14, even though Andelman fails to explicitly teach wherein charged capacitor cells are used to power discharged capacitor cells, Andelman teaches wherein capacitor cells are connected to operate in series in a way that each cell operate within a specified voltage range and the voltage divides across a capacitor in series, such that the highest voltage goes across the smallest value capacitor. A bad cell, i.e. a cell showing an abnormally low capacitance can be bypassed (page 11, line 11 to page 12, line 19). In addition, Andelman teaches wherein the flow-through cells can be useful for energy storage, energy generation and/or fluid purification (page 1, lines 15-19). Therefore, one having ordinary skill in the art would expect the charged capacitor cells of Andelman to be able to power discharged capacitor cells.

Response to Arguments

8. Applicant's arguments with respect to claims 1-28 and 30-32 have been considered but are moot in view of the new ground(s) of rejection. The applicant argues that Andelman ('782) fails to teach a charge sequence controller which individually controls charging of each of said plurality of cells. Therefore, a new ground of rejection has been presented above.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

10. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

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11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to ZULMARIAM MENDEZ whose telephone number is (571)272-9805. The examiner can normally be reached on Tuesday-Friday from 9am to 7pm.

12. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on 571-272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

13. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, Art Unit 1795

/Z. M./
Examiner, Art Unit 1795